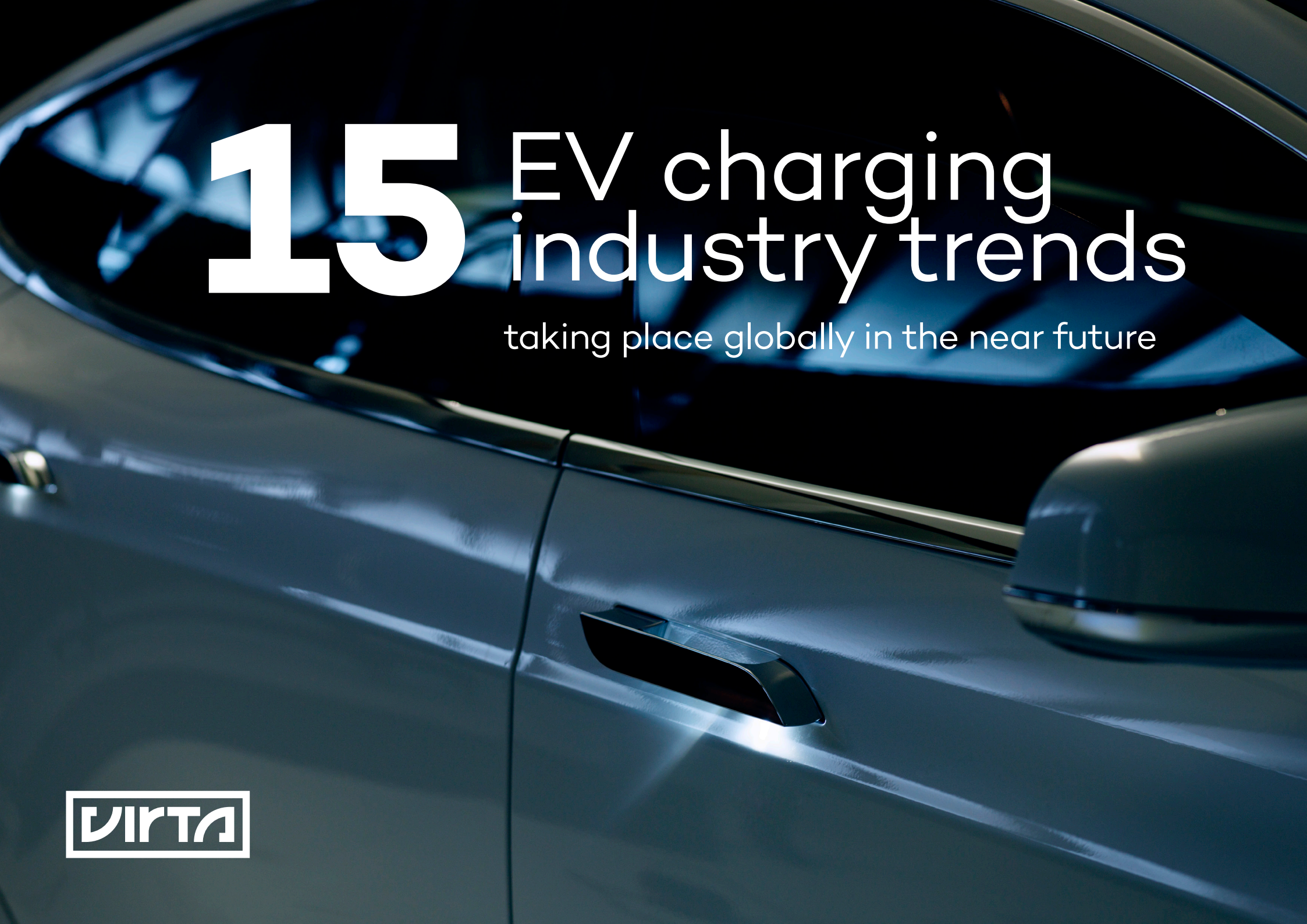


15 EV charging industry trends

taking place globally in the near future

VIRTA

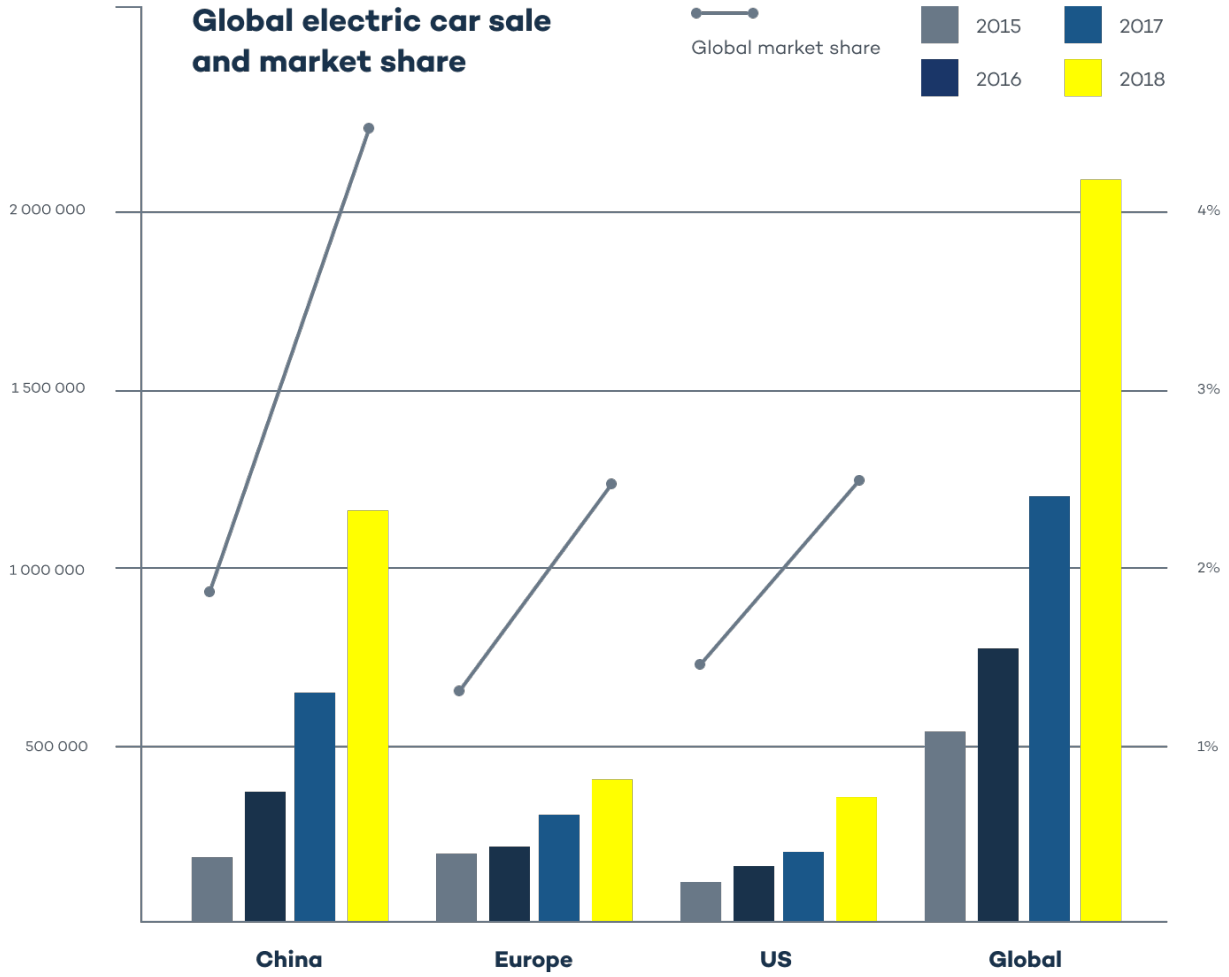
Growing, growing

1

In the past 10 years, the growth in the number of electric vehicles globally has reached **over 60%** in most years.

Decreasing prices of EVs and new car models with bigger batteries are accelerating the growth. The price parity of EVs and combustions engine vehicles are expected to reach within 3 to 5 years. Before this happens, the market is heavily dependent on subsidies.

The businesses in the EV charging industry are expected to grow even faster than the car market - and if your business grows slower than the market, you might get left behind.



Learn more: Global electric vehicle market overview

Here comes the profitability

2

The growth in EV penetration is giving a boost to the use of charging stations as well. The number one prerequisite for a profitable charging network is very traditional: **location, location, location**. Apart from that, the main drivers for profitability are not about the scale of the network, but rather about **the partnership model**. Valuable and carefully chosen partners and externalising platform costs are the keys to success.

Learn more: Harvard Business Review: Three Elements of a Successful Platform Strategy

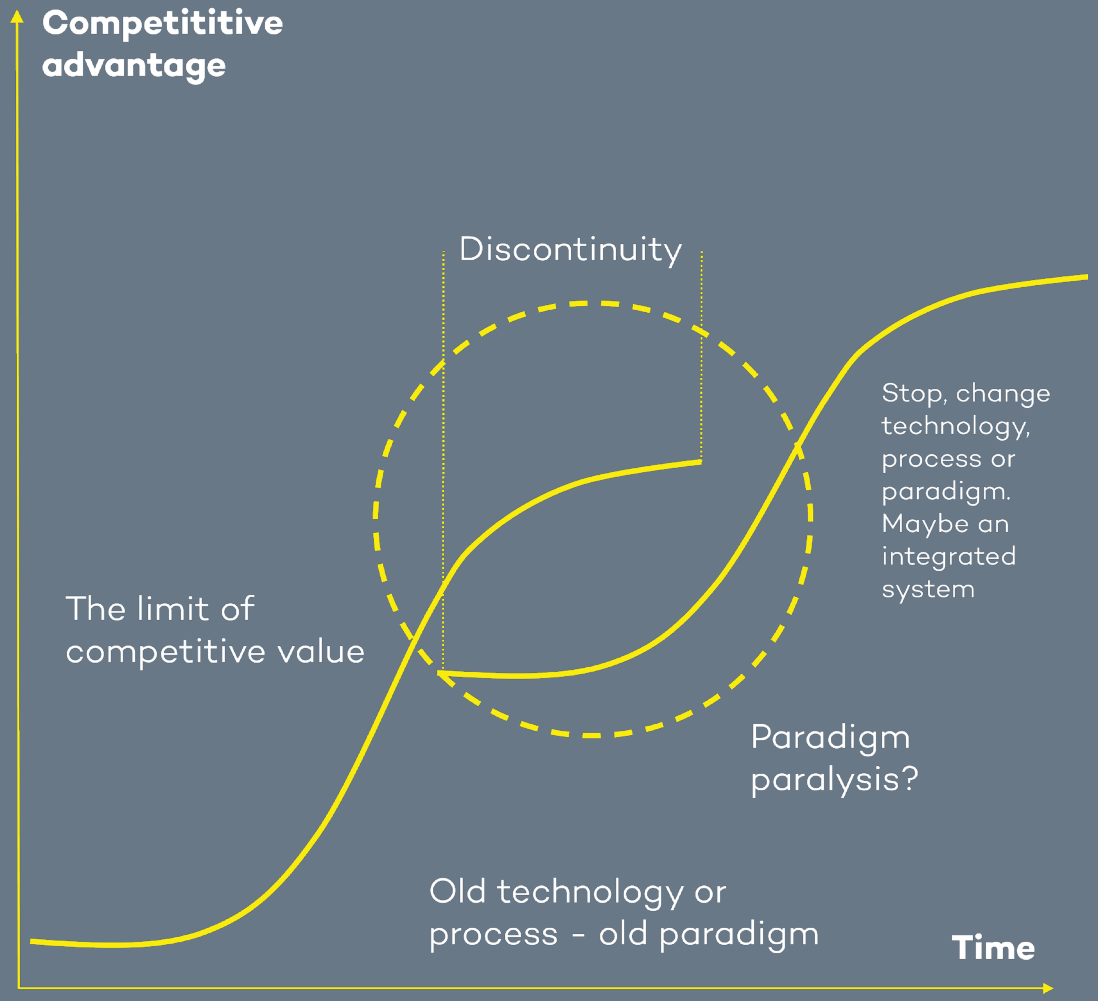
The platform market consolidates in need of investments

3

In the early phases of forming the EV industry, almost every player had their own systems for serving and billing the end-user. As the industry grows, it is natural that smaller players consolidate to gain market position.

The growth and advancement of technologies call for major investments for the implementation of new standards, innovations, security, and reliability – not to forget the customer experience.

The investments in platform technology and innovations define who wins the game, and simultaneously, some of the smallest players will eventually drop out.



Holy and unholy alliances emerge

4

The ecosystemic world of the EV charging networks calls for cooperation among different players. Alliances are a natural next step in the maturing market.

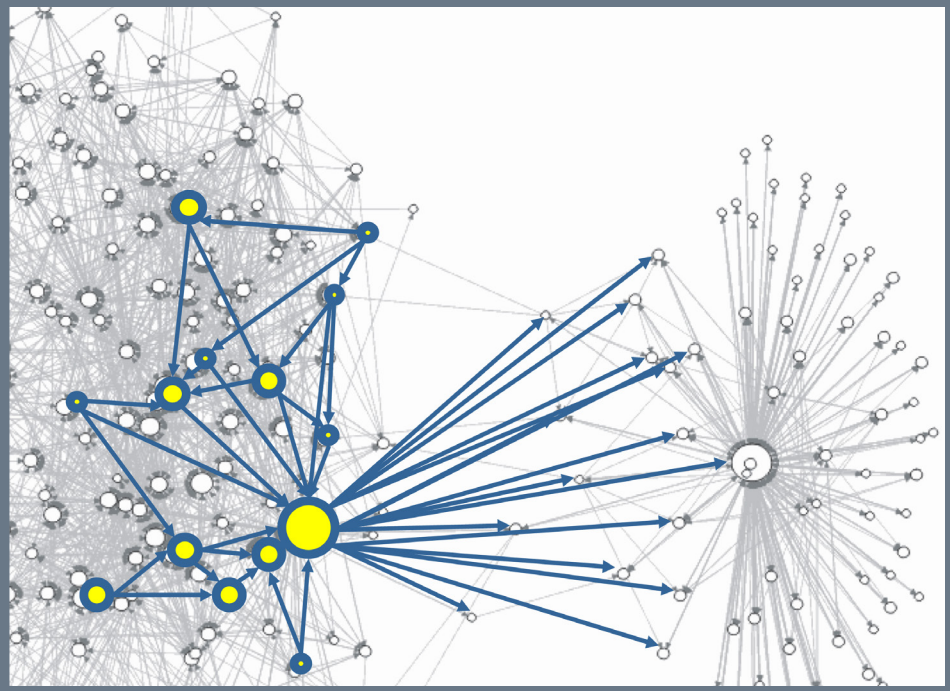
The alliances have several levels from roaming exchange to in-depth partnerships, to co-branding and finally to mergers and acquisitions. Most alliances happen inside the EV charging and complementary industries.

However, there are no industry limits in the game. Industries that used to be seen as rivals for EV's are also building their market positions.

For example, **Shell** has already stepped into the game when they acquired **NewMotion** in 2018, and battery manufacturer **Sonnen** and EV charging platform **Greenlots** in 2019. In 2018 **BP** bought **Chargemaster,** the largest charging network in the UK, and has recently invested in Chinese industry operatives.

Polarisation between open ecosystems and walled gardens

5



Open charging systems are available for everybody and with integrations, anyone can enter the market. These ecosystems will keep evolving and become more gravity-based. The gravity might be about the size of the player, but more often meaning that the actors with the most value to offer in terms of technology, market impact or innovation, have the most gravity and affluence.

Charging platforms have network effects,
meaning that while they attract new users, their value increases.

At the same time, walled gardens will remain relevant. A classic example is Tesla, manufacturing and implementing everything by itself, from hardware to the Supercharger network and charging services. Even with walled gardens, the gravity of each player is based on the capability, offering, and impact, but with walled gardens also the size matters.

Learn more: Harvard Business Review: Three Elements of a Successful Platform Strategy

Video: Case Study – Isorka entered the EV charging market by partnering with Virta

Blurring roles

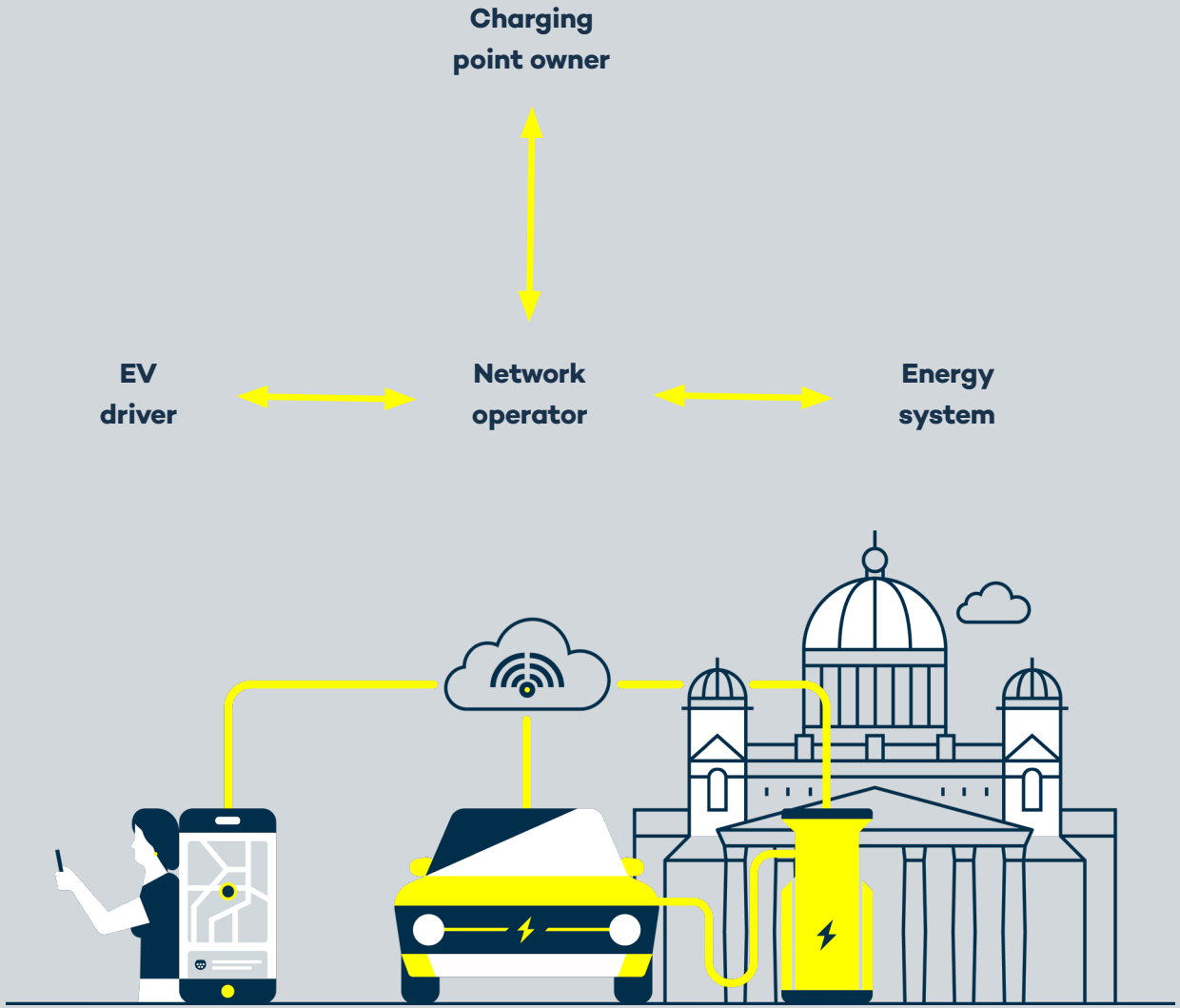
6

The current roles of end-users, Electric Mobility Providers (EMP), Charging Point Operators (CPO) and roaming operators will become more flexible as all players will have to adapt to new kinds of market situations. The platform model will develop to be more complex as the roles of actors become more versatile. In the platform economy, there is no single description of the value chain.

Consumers also grow to become a market party. With digital charging services, consumers are able to both provide charging services to their peers and benefit by selling their battery capacity for aggregated auxiliary energy services. Energy sector actors are also expected to step into the market with even larger investments and intesify the consortium of energy and automotive industries.

Learn more: The two sides of EV charging network operators

Learn more: 2 great reasons why energy utilities should invest in electric vehicles



New connections: Vehicles & charging services

7

New ways of integrating cars and charging services are introduced. The new standard on communication between the car and the charger, ISO15118, enabling identification by only plugging in the cable is a significant step in the communication between the car and the charger.

But that is not all.

Car infotainment systems as interfaces are also developing fast with connected cars. New vehicle-based charging business models are being developed to streamline the user experience and to disrupt the value chain.

Learn more: Plug&Charge technology (ISO15118)

Learn more: Plug&Charge pilot project in France

8

Business models: As-a-service vs. Gas-station

Fast charging networks with so-called *gas station business model* – meaning that charging is not just a small side business next to main services – will gain more and more ground. Tesla already has an extensive Supercharger network, Ionity is building a network of ultra-fast charging stations in Europe, and many others with charging as their primary business will follow.

Outside the main roads, charging points are rather installed based on as-a-service business models, especially in residential buildings and retail and hospitality locations. The ownership and operations diverge, but the charging business is operated by another player than the owner of the charging hardware.

The hardware solution renaissance

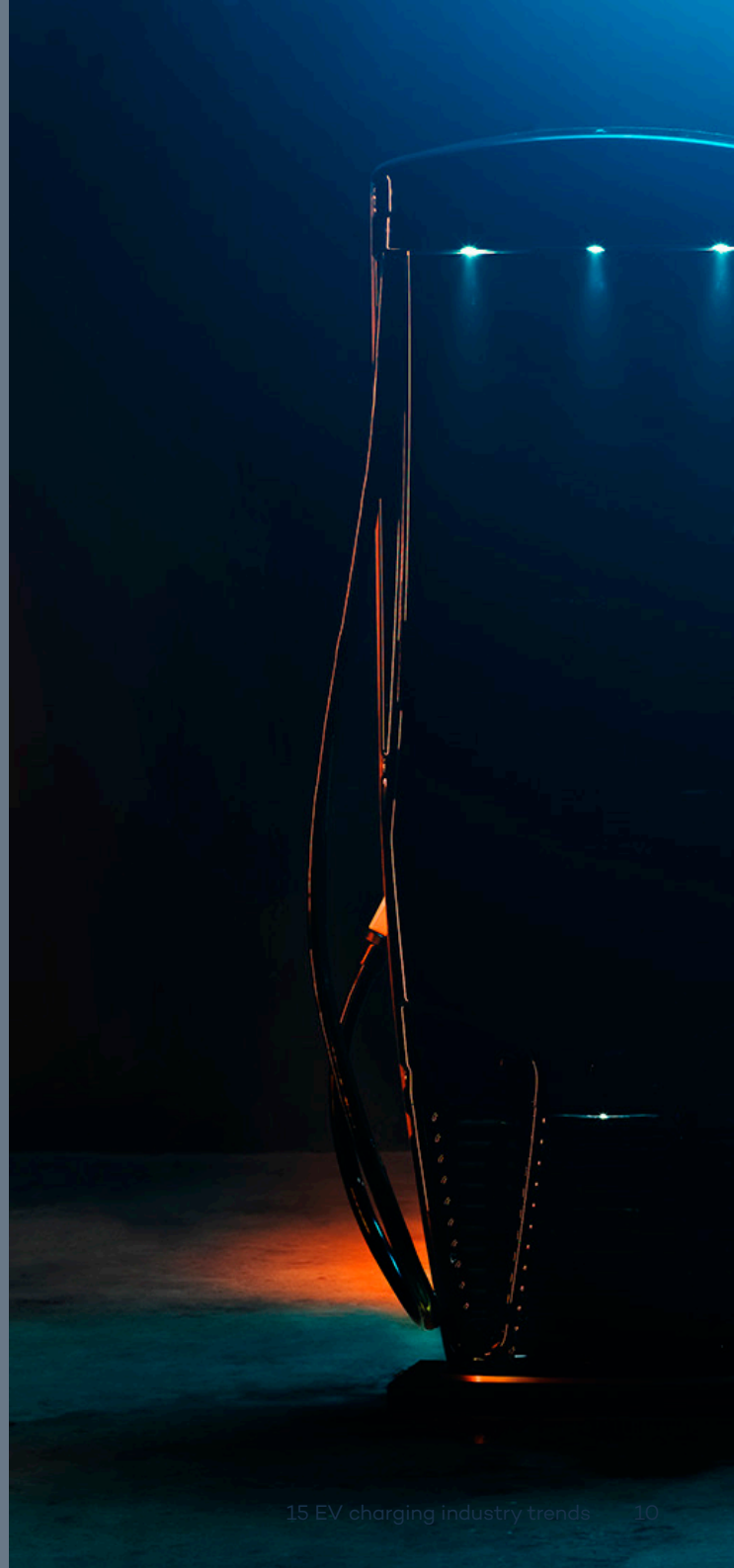
9

The first EV charging devices looked like massive metal boxes with cables and random buttons. As the technology evolves, the operational reliability improves, maximum charging power grows and devices become a seamless part of the infrastructure in cities and highways.

Ultra-fast charging station network keeps growing and stations can charge with a maximum power of 350 kW – some even with 475 kW (even though none of the car models currently available at the market can take such a high power). Also, inductive charging, **bidirectional charging** and devices with advertisement and entertainment opportunities enter the market. **Wireless charging** technology is being developed and tested tirelessly and is seen as one way to end the range anxiety of consumers hesitating to jump into the EV bandwagon.

Technology is changing the rules of design as well. As chargers will play a big part in the cityscape, they will look less like switch box cabinets and more like modern pieces of design.

Learn more: Bidirectional charging

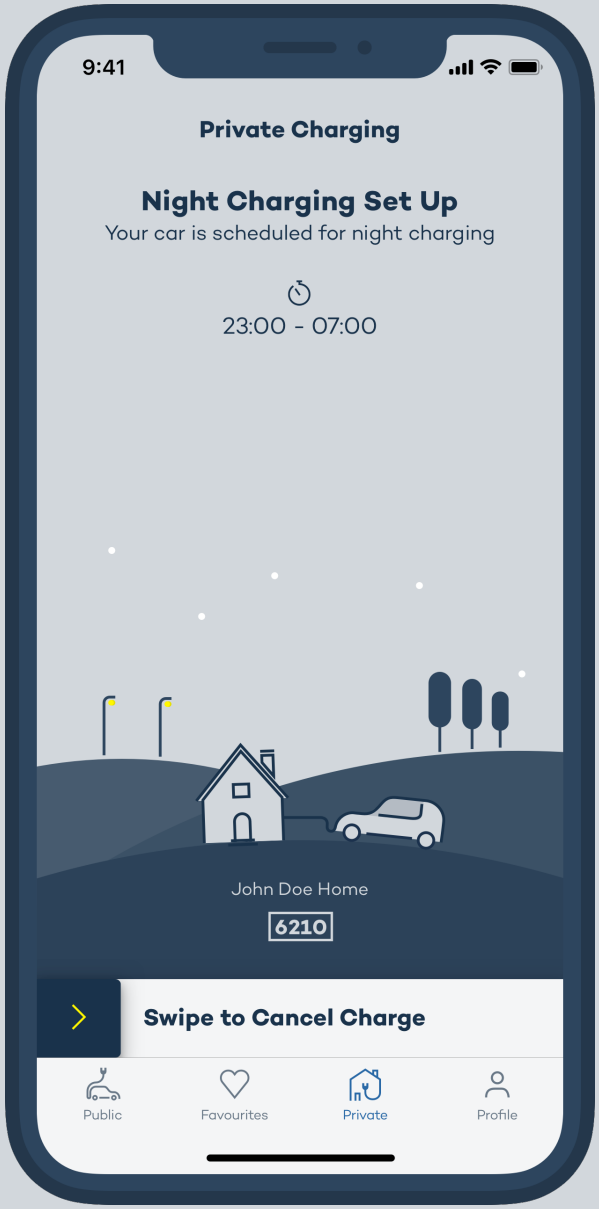


Digital end-user experience 2.0

10

The digital channel (read: mobile app) becomes the dominant (only) channel for consumers to interact with charging stations.

These services integrate public charging, home charging, energy and new intuitive features for making EV charging an effortless part of our lives. Mobility-as-a-service features and public and corporate carshare solutions are integrating seamlessly into EV charging user interfaces.



Charging services connect to energy services

11

Electric cars will work for the planet while you keep on rocking your everyday life. Smart charging services connect EV's to the energy grid and help to balance energy production.

EV's can function as an aggregated load management and storages, protect the local grid and offer demand-response services based on external signals such as grid frequency or market prices. These services are technically available already as auxiliary services by normal chargers, but the business opportunity is multi-folded with V2G technology, allowing energy to be returned back to the grid from EVs.

Learn more: The effect of electric cars on the power grid

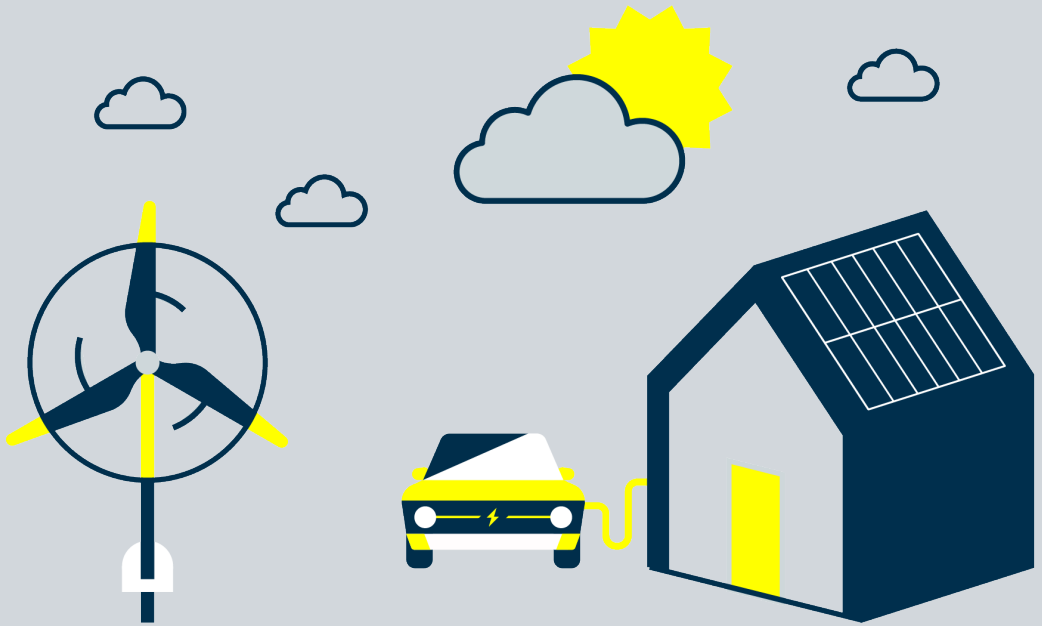
Smart home charging gains ground

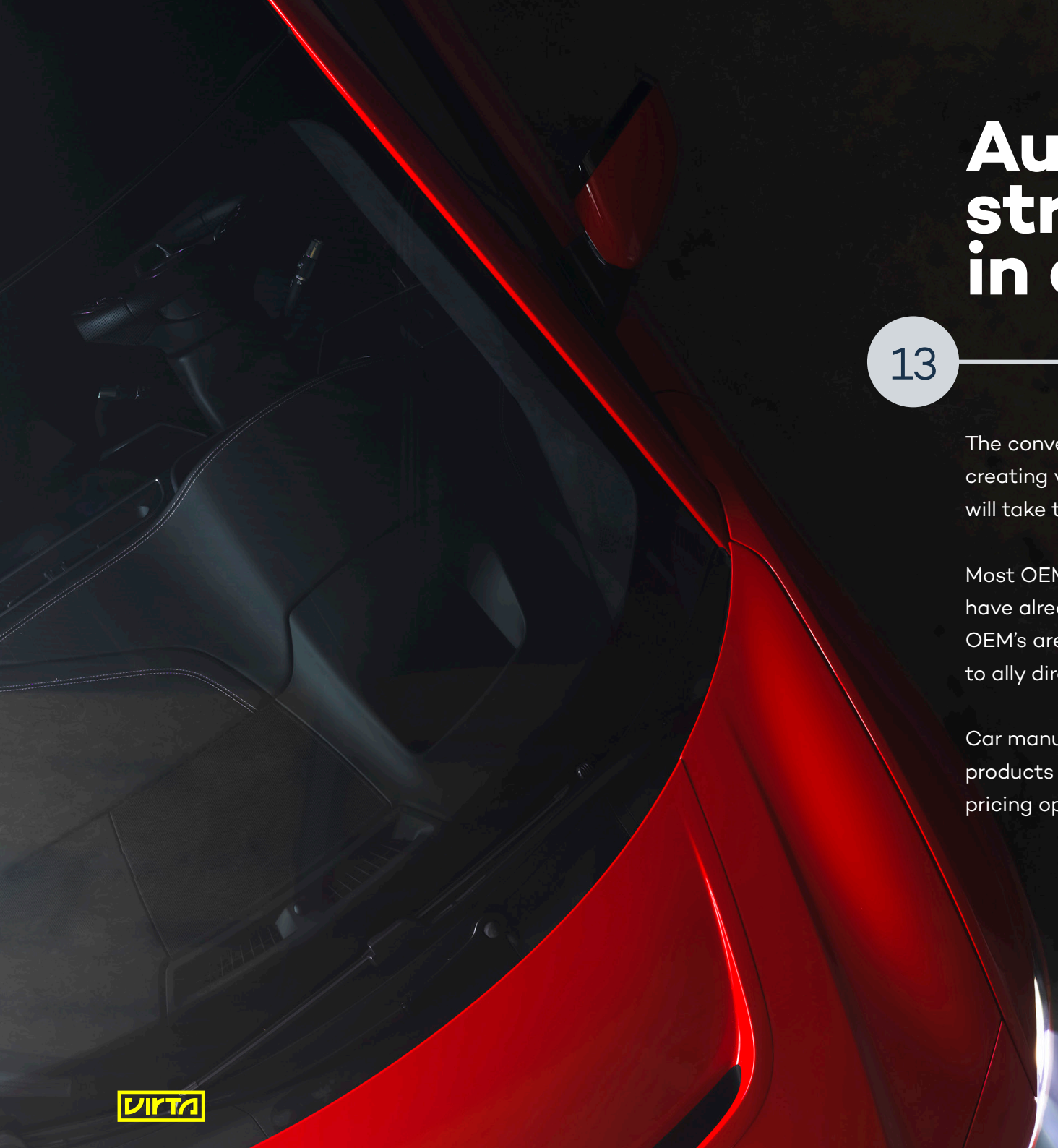
12

Emerging smart EV charging technologies enable user experience to become automated and offer more choices for informed and sustainability-minded consumers. New connected features enable third party intelligent services, such as benefitting from energy price fluctuation and demand response.

Taking part in demand-response is of course optional. The user experience will, in any case, be automated, seamless and as easy-to-use as possible. New incentives will be introduced to encourage consumers to engage: for instance, to enable their vehicles to be used as a part of vehicle-to-grid services.

Learn more: Home charging solutions





Automakers strive for a role in energy retail

13

The convergence of energy and transportation sectors is creating value for both parties, and the question is who will take the biggest part of the value chain.

Most OEM's, in this case meaning the car manufacturers, have already found their own energy subsidiaries. Some OEM's are striving to bypass the current energy retailers to ally directly with grid operators.

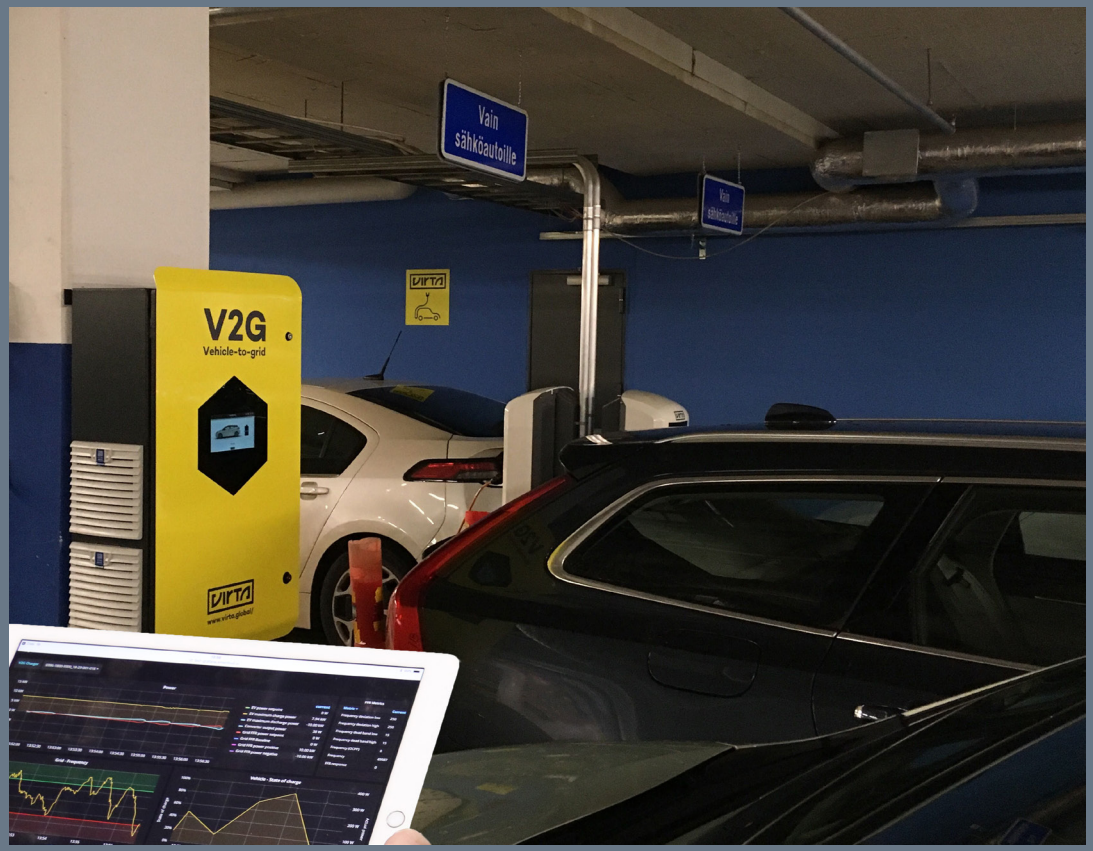
Car manufacturers will start introducing their own energy products with fixed prices allowing convenient customer pricing options.

V2G goes from talks to actions with extensive projects

14

Vehicle-to-grid technologies will seize the market, accelerating the convergence of mobility and energy. With the technology of **bidirectional charging,** energy can be returned back to the grid from car batteries. Demand response is already possible with normal EV chargers, but V2G technology will multiply the earning opportunities. Most cars stay parked 96% of the day and are driven only 4% of the time, thus V2G allows the car to be used as a reserve almost 24/7 instead of just the few hours it is being charged.

Technology, vehicles and charging devices exist, thus extensive V2G projects and rollouts will emerge. The cooperation of mobility and energy sectors is required.



Video: Vehicle-to-grid technology

Picture: Virta V2G solution in action

Stationary batteries <3 EV charging

15

Installing stationary battery storages instead of upgrading the grid connection, especially on fast-charging sites, will become a financially feasible option. In some countries, grid capacity is a scarce resource.

With the ever-increasing number of solar installations, installing battery storage at home is practical. Stationary home batteries and EV's support each other, and enable consumers to be more self-sufficient with energy production and consumption. Some might want to use the combination of solar power and batteries to offer power adjusting services, while others see the combination worthwhile just the opposite way - even to become self-sufficient and decrease the dependency of the electrical grid.

Learn more about our energy solutions:

Virta energy management services

Convinced? Let's get started with your EV charging business:

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